

**Predistortion Circuit and Method for Compensating Nonlinear
Distortion in a Digital RF Communications Transmitter**

Abstract of the Disclosure

5 A digital communications transmitter (100) includes a
digital linear-and-nonlinear predistortion section (200) to
compensate for linear and nonlinear distortion introduced by
transmitter-analog components (120). A direct-digital-
downconversion section (300) generates a complex digital
10 return-data stream (254) from the analog components (120)
without introducing quadrature imbalance. A relatively low
resolution exhibited by the return-data stream (254) is
effectively increased through arithmetic processing. Linear
distortion is first compensated using adaptive techniques with
15 an equalizer (246) positioned in the forward-data stream (112).
Nonlinear distortion is then compensated using adaptive
techniques with a plurality of equalizers (226) that filter a
plurality of orthogonal, higher-ordered-basis functions (214)
generated from the forward-data stream (112). The filtered-
20 basis functions are combined together and subtracted from the
forward-data stream (112).